

IN THE CLAIMS:

Please cancel claims 1-35 without prejudice or disclaimer to the subject matter recited therein, and add the following new claims:

1-35. (Canceled)

36. (New) A process for fabricating metal spheres, comprising:

providing a molten metal mass within a receptacle;

causing a reciprocating motion of a piston to force a droplet of the molten metal mass through an aperture in the receptacle;

buffering the droplet by diminishing internal kinetic energy of the droplet without solidifying the droplet; and

cooling the buffered droplet to the extent that the droplet solidifies into a metal sphere.

37. (New) The process of claim 36, further comprising collecting the metal sphere.

38. (New) The process of claim 37, wherein collecting the metal sphere includes receiving the metal sphere in a reservoir that holds a liquid; passing the metal sphere and a volume of the liquid to a pipe connected to a bottom end of the reservoir; and

delivering the metal sphere from the pipe to a collection basket.

39. (New) The process of claim 38, wherein passing the metal sphere and a volume of the liquid to a pipe includes allowing the metal sphere to slide down a lower side of the reservoir that slopes toward an opening in the pipe.

40. (New) The process of claim 38, wherein collecting the metal sphere further includes allowing the metal sphere to settle in a bend in the pipe.

41. (New) The process of claim 38, wherein delivering the metal sphere from the pipe to the collection basket includes

pumping the metal sphere and the volume of the liquid to a level that is higher than a level of the liquid in the reservoir, and

depositing the metal sphere and the volume of the liquid into the collection basket.

42. (New) The process of claim 41, wherein collecting the metal sphere further includes removing the collection basket.

43. (New) The process of claim 42, wherein collecting the metal sphere further includes passing the volume of the liquid through openings in the collection basket that are smaller than the metal sphere.

44. (New) The process of claim 43, further including returning liquid passing through the openings in the collection basket to the reservoir.

45. (New) The process of claim 44, wherein returning the liquid to the reservoir includes providing the liquid to a return channel in fluid communication with the reservoir.

46. (New) The process of claim 36, wherein causing a reciprocating motion of the piston to force a droplet of the molten metal mass through the aperture in the receptacle includes imparting an impulse force by the piston on the molten metal mass within the receptacle to cause a portion of the molten metal mass to eject through the aperture as the droplet.

47. (New) The process of claim 46, wherein imparting an impulse force by the piston includes causing the piston to abut a wall of the receptacle at an end of the reciprocating motion such that the piston closes off the aperture from inside of the receptacle and forces a droplet of molten metal out of the aperture.

48. (New) The process of claim 46, further comprising positioning the droplet generator such that the droplet is ejected in a generally upward trajectory.

49. (New) The process of claim 48, further comprising directing the trajectory by ejecting the droplet from the aperture through a feed tube extending from the aperture.

50. (New) The process of claim 48, further comprising allowing the ejected droplet to reach a maximum unimpeded height in the upward trajectory.

51. (New) The process of claim 36, wherein buffering the droplet includes passing the droplet through an enclosed gaseous medium having a controlled temperature.

52. (New) A process for fabricating metal spheres, comprising:
generating a droplet from a molten metal mass;
buffering the droplet by diminishing internal kinetic energy of the droplet without solidifying the droplet; and

cooling the buffered droplet to the extent that the droplet solidifies into a metal sphere;

wherein cooling the droplet includes

enclosing the droplet in a gaseous medium; and

controlling the temperature of the gaseous medium.

53. (New) The process of claim 52, wherein controlling the temperature of the gaseous medium includes providing a first fluid at least partially surrounding the gaseous medium.

54. (New) The process of claim 53, wherein controlling the temperature of the gaseous medium includes dispersing a second fluid within the first fluid.

55. (New) The process of claim 54, wherein dispersing the second fluid within the first fluid includes dispersing the second fluid through a plurality of holes in a dispersal tube.

56. (New) The process of claim 54, wherein the first fluid has a first temperature, and the second fluid has a second temperature.

57. (New) The process of claim 52, further comprising collecting the metal sphere.

58. (New) The process of claim 57, wherein collecting the metal sphere includes receiving the metal sphere in a reservoir that holds a liquid;
receiving the metal sphere and a volume of the liquid in a pipe; and
delivering the metal sphere to a collection basket.

59. (New) The process of claim 58, wherein receiving the metal sphere and a volume of the liquid in a pipe includes allowing the metal sphere to slide down lower sides of the reservoir that slope toward an opening in the pipe.

60. (New) The process of claim 58, wherein receiving the metal sphere and a volume of the liquid in a pipe includes allowing the metal sphere to settle in a bend in the pipe.

61. (New) The process of claim 58, wherein delivering the metal sphere to the collection basket includes

pumping the metal sphere and the volume of the liquid to a level that is higher than a level of the liquid in the reservoir, and

depositing the metal sphere and the volume of the liquid into the collection basket.

62. (New) The process of claim 61, wherein collecting the metal sphere further includes disposing the collection basket in a holding tank.

63. (New) The process of claim 62, wherein collecting the metal sphere further includes

removing the collection basket from the holding tank, and

allowing the volume of the liquid to pass through openings in the collection basket that are smaller than the metal sphere.

64. (New) The process of claim 62, wherein collecting the metal sphere further includes returning the liquid passing through the openings in the collection basket to the reservoir.

65. (New) The process of claim 57, wherein returning the liquid to the reservoir includes providing a return channel in fluid communication between the holding tank and the reservoir.

66. (New) The process of claim 52, wherein buffering the droplet includes enclosing the droplet in a buffering gaseous medium that is separate from the gaseous medium in which the cooling occurs, and controlling the temperature of the buffering gaseous medium.

67. (New) A process for fabricating metal spheres, comprising:
generating a droplet from a molten metal mass;
buffering the droplet by diminishing internal kinetic energy of the droplet without solidifying the droplet, in a first medium at a first temperature;
cooling the buffered droplet to the extent that the droplet solidifies into a metal sphere, in a second medium at a second temperature; and
blowing a fluid in a space between the first medium and the second medium to provide temperature separation between the first medium and the second medium.

68. (New) The process of claim 67, further comprising collecting the metal sphere.

69. (New) The process of claim 68, wherein collecting the metal sphere includes

receiving the metal sphere in a reservoir that holds a liquid;
passing the metal sphere and a volume of the liquid to a pipe; and
delivering the metal sphere from the pipe to a collection basket.

70. (New) The process of claim 69, wherein passing the metal sphere and a volume of the liquid to a pipe includes allowing the metal sphere to slide down lower sides of the reservoir that slope toward an opening in the pipe.

71. (New) The process of claim 69, wherein passing the metal sphere and a volume of the liquid to a pipe includes allowing the metal sphere to settle in a bend in the pipe.

72. (New) The process of claim 69, wherein delivering the metal sphere from the pipe to a collection basket includes
pumping the metal sphere and the volume of the liquid to a level that is higher than a level of the liquid in the reservoir, and
depositing the metal sphere and the volume of the liquid into the collection basket.

73. (New) The process of claim 72, wherein collecting the metal sphere further includes disposing the collection basket in a holding tank.

74. (New) The process of claim 73, wherein collecting the metal sphere further includes removing the collection basket from the holding tank, and allowing the volume of the liquid to pass through openings in the collection basket that are smaller than the metal sphere.

75. (New) The process of claim 74, wherein collecting the metal sphere further includes returning the liquid passing through the openings in the collection basket to the reservoir.

76. (New) The process of claim 75, wherein returning the liquid to the reservoir includes providing a return channel in fluid communication between the holding tank and the reservoir.

77. (New) The process of claim 67, wherein the first medium is a gaseous medium, and buffering the droplet includes controlling the first temperature.

78. (New) A process for fabricating metal spheres, comprising:
generating a droplet from a molten metal mass;
buffering the droplet in a first medium by diminishing internal kinetic energy of the droplet without solidifying the droplet;
passing the buffered droplet through a gas screen; and

cooling the buffered droplet in a second medium to the extent that the droplet solidifies into a metal sphere;

wherein the gas screen includes a moving fluid medium that provides temperature separation between the first medium and the second medium.

79. (New) The process of claim 78, wherein a temperature of the first medium is greater than a temperature of the second medium.

80. (New) The process of claim 78, wherein the first medium is disposed above the second medium.

81. (New) The process of claim 78, further comprising collecting the metal sphere.

82. (New) A process for fabricating metal spheres, comprising:
generating a droplet from a molten metal mass, including

containing the molten metal mass in a receptacle that includes a plurality of

walls, an aperture through a first wall of the plurality of walls, and a piston tube,

disposing a piston within the piston tube to form a substantially fluid-tight seal

with the piston tube, and

providing reciprocating motion of the piston within the piston tube to change

pressure of the molten metal mass,

causing the piston to abut the first wall at an end of the reciprocating motion
such that the piston closes off the aperture from inside of the receptacle,
such that an impulse force imparted on the molten metal mass causes a
portion of the molten metal mass to eject through the aperture as the
droplet

buffering the droplet to diminish internal kinetic energy of the droplet without
solidifying the droplet; and
cooling the buffered droplet to the extent that the droplet solidifies into a metal
sphere.

83. (New) The process of claim 82, wherein
buffering the droplet takes place in a first medium;
cooling the droplet takes place in a second medium; and
the first medium is disposed above the second medium.

84. (New) The process of claim 83, further comprising collecting the metal
sphere.

85. (New) A process for fabricating metal spheres, comprising:
generating a droplet from a molten metal mass;
buffering the droplet to diminish internal kinetic energy of the droplet without
solidifying the droplet; and

cooling the buffered droplet to the extent that the droplet solidifies into a metal sphere, including

surrounding the droplet in a gaseous medium,

at least partially enclosing the gaseous medium in a first fluid, and

dispersing a second fluid within the first fluid through a plurality of holes in a dispersal tube.

86. (New) The process of claim 85, wherein the first fluid is a liquid, and the second fluid is a gas.

87. (New) The process of claim 85, wherein the first fluid is liquid nitrogen.

88. (New) The process of claim 85, wherein the second fluid is a gas mixture of hydrogen in nitrogen.

89. (New) The process of claim 85, wherein
buffering the droplet takes place in a buffering medium;
cooling the droplet takes place in a cooling medium; and
the buffering medium is disposed above the cooling medium.

90. (New) The process of claim 89, further comprising collecting the metal sphere.

91. (New) A process for fabricating metal spheres, comprising:
- generating a droplet from a molten metal mass;
 - ejecting the droplet at a generally upward angle, such that the droplet follows a trajectory that proceeds upward until the droplet reaches a maximum height before descending;
 - buffering the droplet by providing a generally upward flow of gas that slows a rate of descent of the droplet as the droplet is descending and diminishes internal kinetic energy of the droplet without solidifying the droplet; and
 - cooling the buffered droplet to an extent that the droplet solidifies into a metal sphere.
92. (New) The process of claim 91, wherein buffering the droplet includes controlling the temperature of the gas.
93. (New) The process of claim 91, further comprising collecting the metal sphere.
94. (New) The process of claims 91, wherein collecting the metal sphere includes
- allowing the metal sphere to fall into a reservoir that holds a liquid;
 - receiving the metal sphere and a volume of the liquid from the reservoir in a pipe connected to a bottom end of the reservoir; and
 - delivering the metal sphere to a collection basket.

95. (New) The process of claim 94, wherein receiving the metal sphere and a volume of the liquid from the reservoir in a pipe includes allowing the metal sphere to slide down lower sides of the reservoir that slope toward an opening in the pipe.

96. (New) The process of claim 94, wherein receiving the metal sphere and a volume of the liquid from the reservoir in a pipe includes allowing the metal sphere to settle in a bend in the pipe.

97. (New) The process of claim 94, wherein delivering the metal sphere to the collection basket includes

pumping the metal sphere and the volume of the liquid to a collection level that is higher than a level of the liquid in the reservoir, and

depositing the metal sphere and the volume of the liquid into the collection basket.

98. (New) The process of claim 97, wherein collecting the metal sphere includes disposing the collection basket in a holding tank; and allowing the volume of the liquid to pass through openings in the collection basket that are smaller than the metal sphere.

99. (New) The process of claim 98, wherein collecting the metal sphere further includes returning the liquid passing through the openings in the collection basket to the reservoir.

100. (New) The process of claim 99, wherein collecting the metal sphere further includes providing a return channel in fluid communication between the holding tank and the reservoir.

101. (New) The process of claim 98, wherein collecting the metal sphere further includes removing the collection basket from the holding tank.